federal register

Monday
March 3, 1980

Part VII

Department of Transportation

Coast Guard

Electrical Engineering Regulations; Supplemental Notice of Proposed Rulemaking

DEPARTMENT OF TRANSPORTATION

46 CFR Parts 110 and 113

[CGD 74-125A]

Revision of Subchapter J, Electrical Engineering

AGENCY: Coast guard, DOT.

ACTION: Supplemental Notice of Proposed Rulemaking.

SUMMARY: In a previous issue of the **Federal Register**, a proposed rewrite of the Coast Guard's Electrical Engineering Regulations was issued. The proposal was issued to update the regulations, clarify them, delete some unnecessary requirements, and incorporate international recommendations. Many letters of comment were received in reaction to this proposed rulemaking. Comments containing valid points have been incorporated into proposed regulations. Some of the changes made as a result of these comments deserve further deliberation and comment before issuance of final rules. These changes have been incorporated in this supplemental notice of proposed rulemaking. Several other changes included in this supplement are new proposals which are not as a result of public comment, but are necessary changes to update the regulations. Comments are invited on any part of this supplement.

DATES: Comments must be received on or before April 17, 1980.

ADDRESSES: Comments should be submitted to Commandant (G-CMC/TP24) (74-125A), U.S. Coast Guard, Washington, D..C 20593. Comments will be available for examination at the Marine Safety Council (G-CMC/TP24), Room 2418, Department of Transportation, Transpoint Building, 2100 Second Street, S.W., Washington, D.C. 20593 between the hours of 7:30 AM to 4:30 PM Monday—Thursday, except holidays. Copies of the Draft Evaluation and Standards cited in this notice are also available for examination at this address.

FOR FURTHER INFORMATION CONTACT: Lieutenant Commander Roger D. Mowery, Project Manager, Office of Merchant Marine Safety (G-MMT-2/TP12), Room 1214, Department of Transportation, Transpoint Building, Washington, D.C. 20593, PH: 202-426-2206.

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rulemaking by submitting written views, data, or arguments. Persons submitting comments should include their names and addresses, identify this notice (CGD 74-125A) and the specific section of the proposal to which each comment applies, and give the reasons for the comments. If an acknowledgement is desired, a stamped, addressed postcard should be enclosed. The supplemented sections of the proposal may be changed in light of comments received. Changes made as a result of these comments will be published in the final rules along with the other changes to the proposed rules upon which the Coast Guard has already received comments. All comments received will be discussed when the final rules are issued, including any comments received on the original proposal, which are not discussed in this supplement. No public hearing is planned but one will be held at a time and place to be set in a later notice in the **Federal Register** if requested in writing by an interested person raising a genuine issue and desiring to comment orally at a public hearing.

DRAFTING INFORMATION: The principal persons involved in drafting the supplement are: Lieutenant Commander Roger D. Mowery, Project Manager, Office of Merchant Marine Safety, and Michael N. Mervin, Project Counsel, Office of Chief Counsel.

DISCUSSION OF THE SUPPLEMENTAL NOTICE: In the June 27, 1977 issue of the **Federal Register** (42 FR 32700), the Coast Guard published a notice of proposed rulemaking (CGD 74-125) which would amend its Electrical Engineering Regulations. As a result of the proposed rulemaking, fifty persons submitted letters of comment. The total number of individual comments exceeded a thousand. Many of these comments contained valid points which have been incorporated into proposed regulations. The changes made as a result of comment upon which the Coast Guard can make final ruling will be incorporated in the final rules. Changes made as a result of comments which deserve further deliberation and comment before final rulemaking have been incorporated in this supplemental notice. Several other changes are new proposals which are not as a result of public comment but are necessary changes to update the regulations. These also have been included in this supplemental proposal.

All changes in this supplemental proposal are discussed below. The changes are amendments to the original proposal; therefore, all section numbers used correspond to those of the proposed regulations and not to the section numbers of the existing regulations.

A change to § 110.25-1a would require submission of fault current calculations, even if the simplified calculation is used. Also, an overcurrent protective device coordination analysis would be required for each generator distribution system. The calculations and study are required under existing regulation but are not specifically mentioned for required plan submission.

A change to § 110.25-1(j) would require that plans be submitted for technical review showing the extent and classification of all hazardous locations on a vessel with hazardous locations as defined in Subpart 111.105. In addition, information identifying electrical equipment to be installed in hazardous locations would be required. This should insure, at the earliest possible time, that hazardous areas are classified correctly and that the equipment in these locations meets the requirements of regulations for such equipment. This is necessary because of the long lead times associated with procuring such equipment. This requirement will be new to the regulations although it is present policy to require these plans and information.

Three comments suggested that intrinsically safe systems should be approved by the Coast Guard and not require approval by U.L. or Factory Mutual since these agencies approve devices and not systems. The comments are wrong in that intrinsically safe equipment obtains third party approval as a system only. Any modification or addition to the approved system (except non-stored energy devices) negates the approval. For instance, the interconnection of intrinsically safe systems is not acceptable unless the third party approval agency investigated the particular interconnection. To help insure that the systems will be installed as approved, § 110.25-1(k) would require plans and installation instructions for each third party approved system.

The addition of §§ 110.25-1(l) and 110.25-1(m) would require that sufficient information be submitted to permit evaluation of equipment that is required to meet Coast Guard requirements or a referenced standard or specification if there is no other evidence such as Underwriters Laboratories listing or manufacturer's certification to indicate compliance. The specific requirement of such information is now required by policy to support equipment approval or acceptance.

Section 111.12-11(b) has been changed as a result of many comments received regarding the prohibition of molded case generator circuit breakers on installations of 25 KW or greater. Some comments did not agree with the statement in the preamble of the original proposal concerning molded case circuit

breakers not being as reliable as open frame circuit breakers. This statement probably should have been read "not as suitable" in lieu of "not as reliable" since the typical molded case circuit breaker did not have curve shaping capabilities, remote control, and the required trips. As some comments pointed out, there are modern molded case circuit breakers with static sensing and fully adjustable static tripping which permits sufficient selectivity and reliability to be used for generator protection. The proposed regulations have been modified to permit molded case circuit breakers, provided they meet certain performance standards, which have been added. This part of the proposed regulations is included in this supplemental proposal to solicit comments on whether there may be any disadvantages in allowing the use of molded case circuit breakers in all applications. The complete section on generator protection is included in this supplement so as to include the performance standards for the breakers.

Two comments questioned the logic of § 111.12–11(h) where the generator and switchboard are in separate spaces. One comment suggested that if the circuit breaker is in the generator space it leaves a section of cable between the switchboard and the breaker that is subject to short circuit currents that may be from several generators whose individual current contribution would not trip their breaker. This is possible, but the number of installations that routinely run three or more generators at any one time is limited. However, to protect this type of installation and keep the circuit breaker at the switchboard, the proposed regulations have been rewritten to require the current transformer to be at the generator and the generator excitation to be removed when the circuit breaker trips. Since this is a significant change in circuit arrangement, the Coast Guard is interested in comments concerning it. This new requirement has been renumbered § 111.12–11(g).

Section 111.50–15(e)(7) of the existing regulations has been added to the proposal as § 111.30–4. However, the regulation has been relaxed and is included in the supplement for comment due to possible safety implications. The present requirement is for a molded-case circuit breaker to be mounted or arranged on a generator or distribution switchboard so that it may be removed without first disconnecting trip or cable connections. The proposed regulations would allow manual disconnecting of the secondary side cable connections.

The requirement to sectionalize the main switchboard has been moved from § 111.30–25(h) of the proposed rules to § 111.30–24 since the IMCO A325 (IX) recommendation is applicable to both AC and DC switchboards and not just AC systems as written in the original proposed rules.

Subpart 111.33 has been completely revised. Eleven comments responded to the original proposed semiconductor rectifier regulations. Several comments pointed out that the regulations covered all semiconductor rectifiers but contained requirements for a large, power-ventilated rectifier. The requirements have been generalized to encompass all power semiconductor rectifiers. Due to the extent of the rewriting of this subpart, it has been republished in its entirety for comment.

The addition of § 111.60–19(d) would not allow cable splices in hazardous locations except in intrinsically safe circuits. This is an addition to the proposal and would adopt the requirement of the American Bureau of Shipping.

A new requirement has been added in § 111.70–3(1) which would require all motor controller contactors that utilize liquid not to leak when inclined at a 30° angle.

In response to the original proposal § 111.79–15, concerning receptacles for refrigerated containers, several comments indicated that the container plugs were being disconnected under load with the present arrangement. The regulation would be revised to require power to receptacle contacts to be deenergized prior to the making or breaking of the connection between the plug and receptacle contacts. Due to the economic impact on refrigerated container shippers, this change is published for further comment.

The entire Subpart 111.93 on electric steering systems is republished in this supplemental notice. The basic definitions in the original proposal made the entire subpart difficult to understand. The subpart has been revised to include new definitions and to incorporate the latest recommendations of the Intergovernmental Maritime Consultative Organization (IMCO) and the National Transportation Safety Board (NTSB).

Sections 111.105–15 and 111.105–17 have been changed to require armored or MI type cable in hazardous areas. This requirement was inadvertently left out of the original proposal.

The addition of § 113.35–3(e) would require vessels with pilothouse control to have an engine order telegraph indicator at each remote local control station in the engineroom. This proposed section would adopt a recommendation of the National Transportation Safety Board.

A new Subpart 113.37 would add requirements for shaft speed and thrust indicators in the wheelhouse and at the engineroom control station. This new subpart would prescribe standards for the indicators. The most important of these would require the indicators to operate independently of the propulsion control system so that the indicators will still function if the vessel must use local control for propulsion. This proposed subpart would adopt a recommendation of the National Transportation Safety Board.

A new Subpart 113.43 would add requirements for a steering failure alarm system which would compare the actual rudder position with the ordered rudder position. The alarm time delay is dependent on the size of the rudder change ordered. This proposed subpart would adopt a recommendation of the National Transportation Safety Board.

This supplemental proposal has been evaluated in accordance with DOT "Regulatory Policies and Procedures," 44 FR 11033 (February 26, 1979). A copy of the draft evaluation may be obtained from Commandant (G–CMC/TP), U.S. Coast Guard, Washington, D.C. 20593, (202) 426–1477.

In consideration of the foregoing, the notice of proposed rulemaking (CGD 74–125) published in the June 27, 1977 issue of the **Federal Register** (42 FR 32700), is hereby modified and the Coast Guard proposes to further amend Chapter I of Title 46, Code of Federal Regulations, as follows:

PART 110—GENERAL PROVISIONS

1. By revising § 110.25–1(a) (6), by adding § 110.25–1(a)(7), by revising § 110.25–1(j), and by adding § 110.25–1(k), (l), and (m) to read as follows:

§ 110.25–1 Plans and information required for new construction.

* * * * *

(a) * * *

(6) Computations of short circuit currents in accordance with Subpart 111.52; and

(7) Overcurrent protective device coordination analysis for each generator distribution system which includes selectivity and shows that each overcurrent device has an interrupting capacity sufficient to interrupt the maximum asymmetrical short-circuit current available at the point of application.

* * * * *

(j) For vessels with hazardous locations as defined in Subpart 111.105,

plans showing the extent and classification of all hazardous locations. Information including manufacturer's name, model identification, and equipment location must be submitted for all electrical equipment in these hazardous locations. For each item of explosion proof or intrinsically safe electrical equipment in a hazardous location, the testing laboratory which approved the equipment along with the class, division, and group for which it is approved must be indicated. Also, operating temperature or temperature range based on operation in the 40°C ambient, must be indicated for heat-producing equipment.

(k) Plans and installation instructions for each intrinsically safe system approved by Underwriters Laboratories Inc., Factory Mutual Research Corporation, or other independent laboratory approved by the Commandant.

(l) Plans or information sufficient to evaluate equipment required by this subchapter to be approved by the Coast Guard.

(m) Plans or information sufficient to evaluate equipment (switches, boxes, etc.) required by this subchapter to meet a referenced standard or specification, except if there is sufficient evidence, such as manufacturer's certification or Underwriters Laboratories Listing, to indicate compliance with the referenced document.

PART 111—ELECTRIC SYSTEM—GENERAL REQUIREMENTS

2. By revising § 111.12–11 to read as follows:

§ 111.12–11 Generator protection.

(a) *Applicability.* This section applies to each generator except a propulsion generator.

(b) *General.* Each ship's service generator and emergency generator must be protected by an individual, trip-free, air circuit breaker whose tripping characteristics can be set or adjusted to closely match the generator capabilities and meet the coordination requirements of Subpart 111.51. Each circuit breaker must contain the trips required by this section.

(c) *Type of trips.* A circuit breaker for a generator must—

(1) Have inverse time overcurrent trips or relays set as necessary to coordinate with the trip settings of the feeder circuit breakers; and

(2) Not have an instantaneous trip with the exception that an instantaneous trip is required if—

(i) Three or more alternating-current generators can be paralleled; or

(ii) The circuit breaker is for a direct-current generator.

(d) *Setting of inverse time trips.* The pickup setting of the longtime overcurrent trip of a generator circuit breaker must not be larger than—

(1) 115 percent of the generator rating for a continuous rated machine; or

(2) 115 percent of the overload rating for a machine with a 2-hour or greater overload rating.

(e) *Setting of instantaneous trips.* The instantaneous trip of a generator circuit breaker must be set above, but as close as practicable to, the maximum asymmetrical short circuit available from any one of the generators that can be paralleled.

(f) *Reverse-power and reverse-current trips.* Each generator arranged for parallel operation must have reverse-power or reverse-current trips.

(g) *Location.* The generator overcurrent protective device must be on the ship's service generator switchboard. If a generator and switchboard are located in different spaces, the installation must meet the following requirements (A control room that is inside of the machinery casing is not considered a separate space for the purposes of this section if the generator is clearly visible from the switchboard.):

(1) The overcurrent device's current sensing mechanism, such as a current transformer, must be in the same space as the generator.

(2) The overcurrent sensing system must be designed to remove excitation from the generator being protected when the generator circuit breaker opens.

(h) *Three-wire, single-phase and four-wire, three-phase generators.* There must be circuit breaker poles for each generator lead, except in the neutral lead.

(i) *Three-wire, direct-current generators.* Each three-wire, direct current generator must meet the following requirements:

(1) *Circuit breaker poles.* There must be separate circuit breaker poles for the positive and negative leads, and, unless the main poles provide protection, for each, equalizer lead. If there are equalizer poles for a three-wire generator, each overload trip must be of the "Algebraic" type. If there is a neutral pole in the generator circuit breaker, there must not be an overload trip element for the neutral pole. In this case, there must be a neutral overcurrent relay and alarm system that is set to function at a current value not more than the neutral rating.

(2) *Equalizer buses.* For each three-wire generator, the circuit breaker must protect against a short circuit on the equalizer bus.

3. By adding § 111.30–4 to read as follows:

§ 111.30–4 Circuit breakers removable from front.

Circuit breakers of the molded-case type, when installed on generator or distribution switchboards, must be mounted or arranged in such a manner that the circuit breaker may be removed from the front without first disconnecting bus connections or deenergizing the supply.

(4) By adding § 111.30–24 to read as follows:

§ 111.30–24 Generation systems, 3,000 kw or more.

When the total installed electric power of the ship's service operation system is 3000 kw or more, the switchboard must have the following:

(a) At least two sections of the main bus that are connected by—

(1) A non-automatic circuit breaker;

(2) A disconnect switch; or

(3) Removable links.

(b) As far as practicable, the connection of generators and duplicated equipment equalized between the sections of the main bus.

5. By revising Subpart 111.33 to read as follows:

Subpart 111.33—Power Semiconductor Rectifiers

§ 111.33–1. General.

This subpart is applicable to all power semiconductor rectifiers. In addition to the regulations contained in this subpart, the requirements of §§ 111.30–11, 111.30–19 and 111.30–21 of this part must be met, if applicable.

§ 111.33–3. Nameplate data.

(a) Each semiconductor rectifier must have a nameplate containing the words "Marine semiconductor rectifier," and the following information:

(1) Manufacturer's name and address.

(2) Manufacturer's serial number.

(3) Type.

(4) Rated AC volts.

(5) Rated AC amperes.

(6) Number of phases.

(7) Frequency.

(8) Rated DC volts.

(9) Rated DC amperes.

(10) Ambient temperature range.

(11) Duty cycle.

(12) Cooling medium.

(b) If, on small rectifiers, the information required by paragraph (a) of this section cannot be shown because of space limitations, the nameplate must be at least large enough to contain the manufacturer's name and serial number. The remaining information must be shown on the schematic diagram.

§ 111.33–5. Installation.

(a) Each semiconductor rectifier must have an adequate heat-removal system that prevents overheating. Rectifiers may be naturally cooled, forced-air-cooled, or water-cooled. An immersed type rectifier must not be used unless—

(1) A non-flammable liquid is used; and

(2) The rectifier is capable of operation without leakage when the ship is inclined to an angle of 30° each side of the vertical.

(b) Semiconductor rectifiers must not be located near sources of radiant heat such as steam pipes and engine exhausts.

(c) Semiconductor rectifiers must be rated for continuous 50°C ambient temperatures and must be capable of satisfactory operation down to a 0°C ambient.

(d) Naturally cooled rectifiers must be installed such that—

(1) The air circulation to and from the rectifier is not restricted; and

(2) The inlet air temperature does not exceed the values for which it was designed.

(e) Forced-air or water-cooled semiconductor rectifiers must be designed to prevent application or retention of power on the rectifier unless the cooling is maintained.

(f) Water-cooled semiconductor rectifiers must be designed for an inlet cooling water temperature of 30°C.

(g) Rectifier stacks must have an enclosure that is watertight or dripproof.

§ 111.33–7. Alarms and shutdowns.

Each power semiconductor rectifier must have a high temperature alarm or shutdown, except as provided in § 111.33–11.

§ 111.33–9. Ventilation exhaust.

The exhaust of each forced-air semiconductor rectifier system must—

(a) Terminate in a location other than a hazardous location under Subpart 111.105 of this part; and

(b) Not impinge upon any other electric device.

§ 111.33–11. Propulsion systems.

(a) Each power semiconductor rectifier in a propulsion system must—

(1) Meet section 35.84.4 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels";

(2) Have current limiting and current rate limiting circuits;

(3) Have external overcurrent protection;

(4) Have a high temperature alarm that activates prior to any high temperature shutdown;

(5) Have internal fuses or other acceptable overcurrent devices that—

(i) Do not operate under external faults, and

(ii) Are coordinated with thyristor capability to protect from internal faults involving only a fraction of the total number of branches in each leg;

(6) Have a system for detecting blown internal fuses; and

(7) Be installed in a place that is as dry as possible.

(b) Each power semiconductor rectifier in a propulsion system must not have piping run over or in its vacinity, if practicable. When such runs of piping are necessary, welded joints only must be used and shielding must be installed to prevent spray from steam or pressurized liquids or any leakage from impinging on the power semiconductor rectifier from the top, bottom, or sides in the event of accidental spillage or piping failures.

6. By adding § 111.60–19(d) to read as follows:

§ 111.60–19. Cable splices.

* * * * *

(d) A cable must not be spliced in a hazardous location except in intrinsically safe circuits.

7. By adding § 111.70–3(l) to read as follows:

§ 111.70–3. Motor controllers and motor control centers.

* * * * *

(l) *Heel angle.* Each controller contactor must be designed for satisfactory operation at a 20° angle of inclination in any direction, and any controller that utilizes liquid must not leak when inclined at a 30° angle.

8. By revising § 111.79–15 to read as follows:

§ 111.79–15. Receptacles for refrigerated containers.

Each receptacle for refrigerated containers must have a switch interlocked in such a way that the receptacle's contacts are deenergized before the making or breaking of the connection between the plug and receptacle contacts. The design of the receptacle must be such that there is no accessible live contact or part when the plug is removed.

9. By revising Subpart 111.93 to read as follows:

Subpart 111.93—Electric Steering Systems

§ 111.93–1. Applicability.

This subpart applies to each steering gear installation that has—

(a) A main steering gear that is electrically powered;

(b) A main steering gear and an auxiliary steering gear that is electrically powered; or

(c) A steering gear control system that is electric or partially electric.

§ 111.93–3. Definitions.

As used in the subpart—

(a) "Main steering gear" means the machinery, the power units and ancillary equipment, and the means of applying torque to the rudder stock, tiller, or quadrant necessary for effecting movement of the rudder for the purpose of steering the ship under normal operating conditions.

(b) "Power unit" means—

(1) In the case of an electric steering gear, an electric motor and its associated electrical equipment such as the motor controller and disconnect switch; and

(2) In the case of an electro-hydraulic steering gear, an electric motor, connected pump, and its associated electrical equipment such as the motor controller and disconnect switch.

(c) "Control system" means the equipment by which orders for rudder movement are transmitted from the navigating bridge to the steering gear power units. Steering gear controls include, but are not limited to—

(1) Transmitters;

(2) Receivers;

(3) Feedback devices;

(4) Hydraulic control pumps, and their associated motors and motor controllers;

(5) Differential units; and

(6) All gearing, piping, shafting, and cables associated with steering gear controls.

§ 111.93–5. General.

when the main and auxiliary steering gears described by § 58.25–20 of this chapter are electrically powered and controlled or when an arrangement of two or more identical power units are utilized in accordance with § 58.25–25 of this chapter, the vessel must have two separate steering systems each consisting of a power unit, steering control system, steering gear feeder, and associated cable and ancillary equipment. The two systems must be separate and independent on a port and starboard basis. Other steering gear systems and arrangements are approved by Commandant (G–MMT) if they are equivalent to the one covered in this section.

§ 111.93–7 Feeder circuits.

(a) Vessels with one or more electrically driven steering power units must have at least two feeder circuits. One of these feeder circuits must be supplied from the ship's service switchboard. The other feeder circuit must be supplied from—

(1) The emergency switchboard if the ship is required by Part 112 of this chapter to have an emergency power source;

(2) An alternate power supply that—

(i) Is available automatically within 45 seconds of loss of power supply from the ship's service switchboard;

(ii) Is from an independent source of power located in the steering gear compartment;

(iii) Is used for no other purpose; and

(iv) Has capacity sufficient for one-half hour of continuous operation of the rudder from 15 degrees on one side to 15 degrees on the other side in not more than 60 seconds with the ship at its deepest sea-going draft while running at one-half of its maximum ahead service speed or 7 knots, whichever is the greater.

(b) Vessels that have a steering gear with two electric motor driven power units must be arranged so that one power unit is supplied by one feeder and the other power unit is supplied by the other feeder.

(c) Each steering gear feeder circuit must be separated as widely as practicable from the other.

(d) Each feeder circuit must have a disconnect switch in the steering gear room.

(e) Each feeder circuit must have a current-carrying capacity of—

(1) 125 percent of the full load current rating of the electric steering gear motor or power unit; and

(2) 100 percent of the normal current of one steering control system current including any associated motors.

§ 111.93-9. Steering control systems.

(a) Each steering power unit must have at least one steering control system.

(b) Each steering control system must be one that can be operated from the pilothouse.

(c) Each steering control system must be arranged in such a way that each steering gear power unit can be controlled in the steering gear room.

(d) The steering control system for a steering power system must be separated as widely as practicable from each other steering control system and each steering power system that it does not control.

(e) Each steering control system must have a switch in the pilothouse that is arranged in such a way that one action of the switch's handle automatically puts into operation a complete steering control system and the associated steering power unit.

(f) If there is more than one steering control system, the switch required by paragraph (e) must be—

(1) Operated by one handle;

(2) Arranged so that not more than one steering control system and its associated steering power system can be energized from the pilothouse at any one time;

(3) Arranged so that the handle passes through an "off"-position when transferring from one steering control system to another; and

(4) In separate enclosures or separated by fire-resistant barriers.

(g) Each steering control system must receive its power from the feeder circuit for its steering power system in the steering gear room.

(h) Each steering control system must have a switch that—

(1) Is in the steering gear room; and

(2) Disconnects the steering control system from its power source.

(i) Each motor controller for a steering gear must—

(1) Be in the steering gear room; and

(2) Have low voltage release.

(j) A means to start and stop each motor for a steering gear must be in the steering gear room.

§ 111.93-11. Overcurrent protection for steering systems.

(a) *Feeder circuits.* Each steering feeder circuit must be protected by a circuit breaker that is on the switchboard from which it is supplied and has an instantaneous trip set at a current of at least—

(1) 300 percent and not more than 375 percent of the rated full-load current of one steering gear main motor for a direct-current steering gear motor; and

(2) 175 percent and not more than 200 percent of the locked-rotor current of one steering gear main motor for an alternating-current steering gear motor.

(b) *No other protection.* A steering feeder circuit must not have any overcurrent protection, except that required under paragraph (a).

(c) *Motor overloads.* A main steering gear motor and a motor for a steering control system must not be protected by an overload protective device. The motor must have a device that operates an audible and visual alarm in the pilothouse and at the main machinery control station if there is an overload that would cause overheating of the motor.

(d) *Short-circuit protection.* Each control circuit of a motor controller, each steering control system, and each indicating and alarm system must have—

(1) Short-circuit protection that is instantaneous and rated at 400 to 500 percent of—

(i) The current-carrying capacity of the conductor; or

(ii) The normal load of the system; and

(2) No other overcurrent protection.

(e) *Protection of steering control systems.* The short-circuit protective device for each steering control system must be—

(1) In the steering gear room; and

(2) In the control circuit just after the steering control system disconnect switch.

§ 111.93-13 Indicating and alarm systems for steering installations.

(a) Visual and audible alarms must activate in the pilothouse and at the main machinery control station upon—

(1) Opening of a steering gear feeder circuit breaker;

(2) Failure of any phase of a three phase supply;

(3) Overload that would cause overheating of the motor;

(4) Failure of the power supply to any steering gear power unit; and

(5) Low oil level of each oil reservoir of a hydraulic power-operated steering system.

(b) Each steering gear power motor and each auxiliary motor for control of the rudder must have a pilot light that lights in the pilothouse when the motor is energized.

(c) The audible alarms required by paragraph (a) of this section must not be sounded by the same device unless the visual alarms indicate the particular failure.

10. By revising § 111.105-15 to read as follows:

§ 111.105-15 Wiring methods for class I hazardous.

(a) Cable for a Class I hazardous location, except as provided in paragraph (b) of this section must—

(1) Be armored or MI type cable; and

(2) Meet Subpart 111.60 of this part.

(b) Cable for use in an intrinsically safe system must meet—

(1) Subpart 111.60 of this part; and

(2) The recommendations of ISA RP 12.6 "Installation of Intrinsically Safe Instrument Systems in Class I Hazardous Locations," except Appendix A.1.

(c) Each explosion-proof enclosure that is in a Class I location must have an approved explosion-proof seal fitting that is—

(1) Threaded directly into the enclosure; or

(2) Connected to the enclosure by a piece of approved explosion-proof rigid metal conduit that is 18 inches (460 mm) or less in length.

11. By revising § 111.105-17 to read as follows:

§ 111.105–17 Wiring methods for class II and class III hazardous locations.

(a) Cable for a Class II or III hazardous location must—

(1) Be armored or MI type cable; and

(2) Met Subpart 111.60 of this part.

(b) Each cable entrance to electric equipment in Class II and Class III hazardous locations must have a dust-tight terminal tube.

PART 113—COMMUNICATION AND ALARM SYSTEMS AND EQUIPMENT

12. By adding § 113.35–3(e) to read as follows:

§ 113.35–3 General requirements.

* * * * *

(e) On vessels equipped with pilothouse control, each local control station in the engineroom must have an indicator if—

(1) Manual operation from the local control station is an alternate means of control; and

(2) The local control station is not immediately adjacent to the engineroom control station.

13. By adding a new Subpart 113.37 to read as follows:

Subpart 113.37—Shaft Speed and Thrust Indicators

§ 113.37–1 Applicability.

This subpart applies to all self-propelled vessels.

§ 113.37–5 General requirements.

(a) Vessels equipped with fixed pitch propellers must have a propeller speed and direction indicator for each shaft installed in the wheelhouse and at the engineroom control station.

(b) Vessels equipped with controllable pitch propellers must have a propeller speed and pitch position indicator for each shaft installed in the wheelhouse and at the engineroom control station.

§ 113.37–10 Detail requirements.

(a) Each indicator must be independent of the propulsion control system. A failure of the propulsion control system must not affect the opertion of the indicators.

(b) Indicators in the wheelhouse must be installed prominently near the rudder angle indicator and must have illumination that does not interfere with the navigation of the vessel at night.

(c) Each electric component of indicators in the wheelhouse must be watertight or be in a watertight enclosure.

(d) Each component material of indicators in the wheelhouse must be corrosion-resistant.

12. By adding a new Subpart 113.43 to read as follows:

Subpart 113.43—Steering Failure Alarm Systems

§ 113.43–1 Applicability.

This subpart applies to each vessel that has power driven main or auxiliary steering gear.

§ 113.43–3 Alarm system.

(a) Each vessel must have a steering failure alarm system that actuates an audible and visible alarm in the pilothouse when the actual position of the rudder differs by more than 5 degrees from the rudder position ordered by the helm for more than—

(1) 30 seconds for ordered rudder position changes of 70 degrees;

(2) 5 seconds for ordered rudder position changes of 1 degree; and

(3) The time period calculated by the following formula for ordered rudder positions changes between 1 degree and 70 degrees:

$$t=(\theta/2.76)+4.64$$

Where

t = maximum time delay in seconds

θ = ordered rudder change in degrees

(b) The alarm system must be separate from, and independent of, each steering gear control system, except for input received from the steering wheel shaft.

(c) The alarm system may have a means for silencing the audible alarm.

§ 113.43–5 Power supply.

Each steering failure alarm system must be supplied by a circuit that—

(a) Supplies no other system;

(b) Is fed from the final emergency power source through the emergency distribution panel in the wheelhouse, if installed; and

(c) Has no overcurrent protection except short-circuit protection by an instantaneous fuse or circuit breaker rated or set at 400 to 500 percent of—

(1) The current-carrying capacity of the smallest alarm system interconnecting conductors; or

(2) The normal load of the system.

(46 U.S.C. 375, 390(b), 391(a), 416, 526p; 49 U.S.C. 1655(b); 49 CFR 1.46)

Dated: February 25, 1980.

Henry H. Bell,

Rear Admiral, U.S. Coast Guard, Chief, Office of Merchant Marine Safety.

[FR Doc. 80–6592 Filed 2–29–80; 8:45 am]

BILLING CODE 4910–14–M